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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference IPD/P1206/WOD	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB99/03538	International filing date (day/month/year) 26/10/1999	Priority date (day/month/year) 28/10/1998
International Patent Classification (IPC) or national classification and IPC C12N9/02		
Applicant THE SECRETARY OF STATE FOR DEFENCE et al.		
1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 4 sheets, including this cover sheet. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of sheets.		
3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application		

Date of submission of the demand 19/05/2000	Date of completion of this report 14.08.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Kaas, V Telephone No. +49 89 2399 8704



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/03538

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-23 as originally filed

Claims, No.:

1-30 as originally filed

Drawings, sheets:

1/8-8/8 as originally filed

2. The amendments have resulted in the cancellation of:

- the description, pages:
 the claims, Nos.:
 the drawings, sheets:

3. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- the entire international application.
 claims Nos. 1-5,7,8,21-30(all partially),6,9-20.

because:

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- the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

- the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

- the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- no international search report has been established for the said claims Nos. 1-5,7,8,21-30(all partially),6,9-20.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims 1-5,7,8,21-30 (all partially)
	No:	Claims
Inventive step (IS)	Yes:	Claims 1-5,7,8,21-30(all partially)
	No:	Claims
Industrial applicability (IA)	Yes:	Claims 1-5,7,8,21-30(all partially)
	No:	Claims

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/03538

1) The present application appears to show for the first time that substitution of threonine at position 214 of the *Photinus pyralis* luciferase by either a cysteine, an asparagine or an alanine residue results in a mutant enzyme having increased thermostability. This is convincingly shown in Example 7 of the description. Mutant luciferases with point mutation at position 214 do not appear to be disclosed in the cited prior art, nor has the importance of this position with respect to thermostability been anticipated or suggested therein.

The position 214 substituted *Photinus pyralis* luciferase of claim 1 as well as the kit, nucleic acid, vector, cell, plant and assays relating to said mutant therefore appear to be novel and to involve an inventive step. Claims 1-5, 7, 8 and 21-30 (all partially) thus appear to satisfy the criterions as set forth in Articles 33(2) and 33(3) PCT.

2) Given that the amino acid residue at position 214 of the wild-type sequence of *Photinus pyralis* is a threonine, claims 5 and 7 appear to be redundant with claim 1. Claim 5 and 7 therefore do not satisfy the criterion as set forth in Article 6 PCT (conciseness).

3) Moreover, claims 1, 5 and 7 are not substantially supported over their whole scope (Article 6 PCT). The sole support, in terms of experimental example, is represented by the *Photinus pyralis* luciferase mutants T214C, T214N and T214A referred to in Example 7. There are no evidences in the description that the substitution of threonine at position 214 with residues other than cysteine, asparagine or alanine provides the desired effect of increased thermostability.